

INDIRECT MEASUREMENT OF DILUENTS  
IN A MULTI-COMPONENT NATURAL GAS

ABSTRACT

A method of indirectly measuring the diluent  
(nitrogen and carbon dioxide) concentrations in a natural  
gas mixture. The molecular weight of the gas is modeled  
5 as a function of the speed of sound in the gas, the  
diluent concentrations in the gas, and constant values,  
resulting in a model equation. A set of reference gas  
mixtures with known molecular weights and diluent  
concentrations is used to calculate the constant values.  
10 For the gas in question, if the speed of sound in the gas  
is measured at three states, the three resulting  
expressions of molecular weight can be solved for the  
nitrogen and carbon dioxide concentrations in the gas  
mixture.